

Remarks

Claims 57-61, 63, and 65-112 are now pending in this application. Applicants have not amended the claims. Applicants respectfully request favorable reconsideration of this application.

The Examiner rejected claims 57-61, 63, and 65-112 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent publication 2002/068488 to Tuller et al. in view of U.S. patent 6,747,291 to Lu et al.

The combination of Tuller et al. and Lu et al. does not suggest the claimed invention since, among other things, the combination does not suggest a body having at least a contact surface coated with a contact layer including a film including a multielement material that includes at least one of a carbide or nitride; and at least one nanocomposite including single elements, binary phases, ternary phases, quaternary phases or higher order phases based on atomic elements in the $M_{n+1}AX_n$ compound, wherein the nanocomposite includes at least one of M-X and M-A-X nanocrystals and at least one amorphous region with M, A, X elements in one or several phases. Tuller et al. suggests electrical contact 14 that includes titanium silicon carbide and may include some other elements. However, Tuller et al. does not suggest at least one nanocomposite including single elements, binary phases, ternary phases, quaternary phases or higher order phases based on atomic elements in the $M_{n+1}AX_n$ compound, wherein the nanocomposite includes at least one of M-X and M-A-X nanocrystals and at least one amorphous region with M, A, X elements in one or several phases.

Along these lines, Tuller et al. suggests creating an ohmic or Schottky contact to SiC devices using MAX phases with different combinations of elements, but mainly Ti_3SiC_2 . The interface in this contact is solid, which means that the layer of Ti_3SiC_2 is deposited or grown on the SiC device and forms a solid body. Tuller et al. does not include any suggestion to incorporate in the electrical contact the additional elements recited in the claims.

Rather, Tuller et al. suggests a solution to the technical problem of how to improve the contact properties or functionality, for example to obtain a contact surface with low friction, of a multielement material in a film for a contact element. One of ordinary skill in the art solving this problem would not arrive at the solution of the claimed invention that includes a multielement material including a nanocomposite including nanocrystals and amorphous regions especially since Tuller et al. does not suggest such a structure. Rather, quite the opposite, Tuller et al. suggests how to achieve a solid interface toward a substrate. Tuller et al. does not suggest how to provide an electric contact element having a contact layer with low friction for making an electric contact-to-contact member.

Additionally, the combination does not suggest a contact layer that includes at least one amorphous region including M, A, X elements in one or several phases, where M is a transition metal or a combination of a transition metals, A is a group A element or a combination of a group A element, and X is Carbon, Nitrogen or both. As noted above, Tuller et al. does not suggest all of the elements in the multielement material of the claimed contact layer, which includes amorphous carbon. Lu et al. does not overcome these deficiencies. Rather, Lu et al.

suggests a contact layer that includes crystalline graphite. Along these lines, Lu et al. suggests a SiC surface covered with amorphous graphite that is converted during an annealing step to sp² carbon. Lu et al. describes this in the abstract and specification and recites this in the claims of Lu et al. Therefore, the combination of Tuller et al. and Lu et al. does not suggest the contact layer recited in the claims.

Furthermore, the combination of Tuller et al. and Lu et al. does not suggest a nanocomposite including at least one of M-X and M-A-X nanocrystals. The Examiner asserts that col. 5, lines 35-40 suggest such nanocrystals. However, this passage only suggests nano-graphitic flakes. Therefore, Lu et al. does not suggest the nanocrystals recited in the claims.

In view of the above, the references relied upon in the office action do not suggest patentable features of the claimed invention. Therefore, the references relied upon in the office action do not make the claimed invention obvious. Accordingly, Applicants submit that the claimed invention is patentable over the cited references and respectfully request withdrawal of the rejection based on the cited references.

If an interview would advance the prosecution of this application, Applicants respectfully urge the Examiner to contact the undersigned at the telephone number listed below.

The undersigned authorizes the Commissioner to charge fee insufficiency and credit

overpayment associated with this communication to Deposit Account No. 22-0261.

Respectfully submitted,

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